Peaceful Nuclear Cooperation

U.S. Support for NPT Article IV

UNITED STATES & MEXICO

Through the International Atomic Energy Agency (IAEA), the United States contributes to the work of many countries using nuclear materials and technology for peaceful purposes. In recent years, U.S. support has focused on achieving tangible and lasting benefits in fields that are vital to human development, including agriculture, human health, water resource management, and human resource development. Since 2000, the IAEA has approved and funded $8,350,345, including $393,924 in 2013, under its Technical Cooperation (TC) program for projects in Mexico.

In addition to the United States' longstanding support for the IAEA's activities to promote peaceful nuclear applications, at the 2010 NPT Review Conference, the United States announced a $100 million USD effort to expand this support over the next five years. The United States has pledged $50 million towards the IAEA's Peaceful Uses Initiative (PUI), focusing on human health, food security, water resource management, and nuclear power infrastructure development.

The United States views its support for peaceful uses of nuclear energy, to which all NPT Parties are entitled, as a critical part of its broader effort to strengthen the IAEA and the global nuclear nonproliferation regime. The U.S. has already designated over $22 million for IAEA projects benefitting over 120 countries, including Mexico, for which funding was previously unavailable. The United States is working with partners to reach the $100 million goal, and welcomes Japan, the Republic of Korea, New Zealand, the Czech Republic, Hungary, Sweden, Australia, France, Indonesia, Brazil, Italy, the UK and Kazakhstan who have announced their own commitments to the PUI of over $12 million.

AGRICULTURE

Food systems in developing countries are not always as developed as in the industrialized world, and when the quality and safety of food supplies suffers, the people in those countries are therefore exposed to a wide range of potential food quality and safety risks. Additionally, for most developing countries, agriculture lies at the center of their economies and food exports are a major source of foreign exchange and income generation, but access to food export markets depends on their capacity to meet the regulatory requirements of importing countries. Mexico is therefore participating in a regional TC project supported by the United States to ensure food safety, promote good agricultural and production practices, and enhance food exports by using nuclear techniques to monitor chemical residues and contaminants in food products.

HUMAN HEALTH

Early and accurate diagnosis is vital for effective treatment of both heart disease and cancer. The diagnostic and therapeutic applications of nuclear medicine techniques play a pivotal role in the management of these patients, improving the quality of life by means of an early diagnosis allowing opportune and proper therapy.

With cardiovascular disease as the leading cause of death in most Latin American countries and almost 800,000 new cases of cancer in the region each year, Mexico is currently working through a regional TC project supported by the United States to improve the management of cardiac diseases and cancer patients by strengthening nuclear medicine techniques in Latin America and the Caribbean region.

Latin America also faces a double burden today: on the one hand, under-nutrition, and on the other hand, obesity. Mexico is therefore participating in a regional TC project supported by the United States to improve the capacity of key institutions to use nuclear techniques to address each extreme of malnutrition. These

1. *Power plant under construction. Credit: Kansai Electric Power Co.*
2. *Scientists are constantly looking at ways to improve crops using nuclear techniques. Credit: Centro Energia Nuclear Agricultura, CENA/USP*
3. *Nuclear analytical techniques can evaluate how well food, fortified with essential nutrients and minerals, sustains the body's health and growth. Credit: IAEA*

techniques include isotopic dilution with deuterium to assess body composition, as well as carbon-13 to measure fat and glucose oxidation. The project will improve the quality of programs in the region; contribute tools for the diagnosis and evaluation of micronutrient deficiencies, obesity and obesity-related chronic diseases; as well as allow the establishment of data for those programs, which will help in the identification of vulnerable groups, planning, and the prioritization of actions to be applied.

NUCLEAR ENERGY

After several years of work and development at the Laguna Verde Nuclear Power Plant (LVNPP), both units have completed the technical and engineering process for carrying out an Extended Power Uprate (EPU). The structures, systems and components will therefore be subject to new operating conditions mainly due to increased flow and increased neutron fluency. As a result, the main aging mechanisms associated with long-term operation of the plant must be evaluated and studied. A renewal process is also needed to allow continued operation beyond the original 30-year license period; therefore, Mexico is working through a national TC project supported by the United States to evaluate the effects of the EPU to support license renewal for LVNPP.

NUCLEAR FUEL

Several countries including Mexico, recently participated in a U.S.-supported regional TC project to facilitate the return of highly enriched and low-enriched uranium to the country of origin. The project assisted participating countries with research reactors to repatriate, manage, or dispose of their fresh or irradiated fuel, and supported the Russian Research Reactor Fuel Return program and the Global Threat Reduction Initiative.

NUCLEAR SAFETY

Disused facilities and sites contaminated because of activities involving the use of radioactive material exist worldwide and many pose continuing health risks to adjacent communities and, potentially, to the wider public. Mexico is currently participating in an interregional TC project supported by the United States that will provide support and assistance toward the efficient clean-up of radioactive contaminated facilities and sites. Through this project, barriers to the acceptance of continued or expanded applications of peaceful uses of nuclear technology can, to some extent, be removed.

Mexico is also currently participating in a regional TC project supported by the United States to improve the operational national regulatory infrastructure for safety and control of radiation sources to ensure the protection of people and the environment against the adverse effects of ionizing radiation. The project will harmonize and streamline participating countries' national capabilities for regulatory control in compliance with international requirements and establish or develop a comprehensive national system for preparedness and response to radiological emergencies.

Human resource development is critical for Member States to implement and sustain nuclear security, so Mexico is also participating in a regional TC project supported by the United States to implement the component of the IAEA Nuclear Security Plan 2010-2013 which focuses on institutional capacity building, human resource development and educational programs. Strengthening nuclear security human resource development will contribute to sustained effective nuclear security worldwide.

HUMAN RESOURCES

Since 2000, the United States has hosted multiple training courses that included Mexicans in fields such as nuclear safety and security, quality assurance in radiotherapy, insect pest control, and developing national long-range nuclear energy strategies. Thirty-three Mexicans also trained in the U.S. through the IAEA Fellowship Program, 19 of which were supported by the United States, in fields including sustainable energy development and plant breeding.

Additionally, since 2000, 52 U.S. experts have traveled to Mexico to collaborate through various IAEA Technical Cooperation projects. Examples of some topics include uranium, electricity generation, emergency plans, safety, decision tools, isotopes, and waste.

IAEA fellows receive training in plant breeding. Credit: Dean Calma/IAEA

Through bilateral efforts, the United States has provided support to Mexico for various projects. In 2002, the U.S. Nuclear Regulatory Commission made an agreement with the Comisión Nacional de Seguridad Nuclear y Salvaguardias (CNSNS) for nuclear safety research. In April 2005, Mexico's National Institute of Nuclear Research (ININ) signed the fifth renewal of an agreement with the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA) that allowed for the continued exchange of information and cooperation in the field of peaceful uses of nuclear energy. In June 2006, scientists from ININ, Los Alamos National Laboratory, and Oak Ridge National Laboratory consulted and presented seminars on the SCALE computer code, the use of Monte Carlo N-Particle Transport Code (MCNP) in reactor pressure vessel fluence assessments, and thermal hydraulics codes and methods.

Additionally, since 2000, two Mexican physicians have been certified in the U.S. through the American Board of Nuclear Medicine.